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| 10/042,936 | 01/09/2002 | Lars Langemyr | CMM-00202 | 4595 |

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EXAMINER

SHARON, AYAL I

ART UNIT PAPER NUMBER

2123

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/042,936

Applicant(s)

LANGEMYR ET AL.

Examiner

Ayal I. Sharon

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-78 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-78 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 April 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/20/02, 3/12/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Introduction

1. Claims 1-78 of U.S. Application 10/042,936 filed on 01/09/2002 are presented for examination. The Application is a CIP of U.S. Application 09/995,222, filed on 11/27/2001, which claims benefit to U.S. Application 60/253,154. The Application is also a CIP of U.S. Application 09/675,778, filed on 9/29/2000, which claims benefit to U.S. Application 60/222,394.

Drawings

2. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

Information Disclosure Statement

3. This application is a CIP of co-pending U.S. Application 09/995,222. Examiner notes that the two Information Disclosure Statements submitted in this application were not submitted in the co-pending parent case. Examiner believes that these Information Disclosure Statements are relevant to the parent case and should be submitted in the parent case.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. **Claims 2, 4-6, 8, 41, 43-45, and 47 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 09/995,222. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.**
6. The following limitations of Claims 1 and 2 of the instant application are identical to the limitations in Claim 1 in the co-pending application:
- a. This limitation in Claim 1 of the instant application:
1. A method executed in a computer system for producing a combined system of partial differential equations comprising:
- is identical to this limitation in Claim 1 of the co-pending application:
1. A method executed in a computer system for producing a combined system of partial differential equations comprising:
- b. This limitation in Claim 1 of the instant application:

representing each of a plurality of systems as an application mode modeling physical quantities of said each system;

is identical to this limitation in Claim 1 of the co-pending application:

representing each of a plurality of systems as an application mode modeling physical quantities of said each system;

c. This limitation in Claim 1 of the instant application:

forming said combined system of partial differential equations using partial differential equation systems associated with said plurality of systems.

is identical to this limitation in Claim 1 of the co-pending application:

forming said combined system of partial differential equations using partial differential equation systems associated with said plurality of systems.

However, the following limitations in Claims 1 and 2 of the instant application:

determining a representation of a partial differential equation system for each application mode corresponding to one of said plurality of systems using at least one non-local coupling, said at least one non-local coupling determining a value in at least one point depending on a value from at least one other point; and

2. The method of Claim 1, wherein said non-local variable defines a value from a first domain in a first geometry to another domain in a second geometry.

are not identical to the following limitations in Claim 1 of the co-pending

application (the differences have been underlined):

determining a representation of a partial differential equation system for each application mode corresponding to one of said plurality of systems using at least one non-local coupling, said at least one non-local coupling defining a value from a first portion of a first domain to another part of a second domain; and

The two claims are not patentably distinct from each other because (1) examiner interprets that the term "geometry" corresponds to "domain", and (2) the limitation of "determining a value ..." is inherent in the claim of the co-pending application, otherwise the claimed invention does not produce any output.

7. Dependent claim 4 in the instant application is identical to dependent claim 2 in the co-pending application.

8. Dependent claims 5-6 in the instant application are identical to dependent claims 3-4 in the co-pending application, with the exception of the use of the term "domain" instead of "geometry" in the co-pending application. Examiner has found that these terms correspond to one another.
9. Dependent claim 8 in the instant application is identical to dependent claim 6 in the co-pending application.
10. Claims 41, 43-45, and 47 in the instant application are computer program product claims that are equivalent to the rejected method claims 2, 4-6, and 8, and are therefore rejected on the same grounds. The equivalent computer program product claims in the co-pending application are 15, 17-19, and 21.

Claim Rejections - 35 USC § 101

11. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

12. An invention which is eligible for patenting under 35 U.S.C. § 101 is in the "useful arts" when it is a machine, manufacture, process or composition of matter, which produces a concrete, tangible, and useful result. *The fundamental test for patent eligibility is thus to determine whether the claimed invention produces a "useful, concrete and tangible result."* The test for practical application as applied by the examiner involves the determination of the following factors:

(1) "Useful" - The Supreme Court in *Diamond v. Diehr*, 450 U.S. 175, 209 USPQ 1 (1981) requires that the examiner look at the claimed invention as a

whole and compare any asserted utility with the claimed invention to determine whether the asserted utility is accomplished. Applying utility case law the examiner will note that:

(a) the utility need not be expressly recited in the claims, rather it may be inferred.

(b) if the utility is not asserted in the written description, then it must be well established.

(2) "Tangible" - Applying *In re Warmerdam*, 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994), the examiner will determine whether there is simply a mathematical construct claimed, such as a disembodied data structure and method of making it. If so, the claim involves no more than a manipulation of an abstract idea and therefore, is nonstatutory under 35 U.S.C. § 101. In *Warmerdam* the abstract idea of a data structure became capable of producing a useful result when it was fixed in a tangible medium that enabled its functionality to be realized.

(3) "Concrete" - Another consideration is whether the invention produces a "concrete" result. Usually, this question arises when a result cannot be assured. An appropriate rejection under 35 U.S.C. § 101 should be accompanied by a lack of enablement rejection, because the invention cannot operate as intended without undue experimentation.

13. Claims 1-78 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The Examiner respectfully

submits that the rejected claims do not recite a useful result. The claims are not tangible because the cited claims do not clearly define what is the utility of the output of the invention (the "result").

14. Claims 1-11, 16-32, 40-50 and 55-71 are rejected under 35 U.S.C. 101

because the claimed invention is directed to non-statutory subject matter.

The Examiner respectfully submits that the rejected claims do not recite a concrete result. The claims are not concrete because the cited claims do not clearly define the output of the invention (the "result").

15. In addition, Claims 40-78 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

- a. Regarding independent claims 40 and 72, the claims recite "A computer program product ... comprising machine executable code" with the apparent claim limitations describing functional descriptive material. The term "product" is indefinite: it could refer to a program, to computer readable media, etc.
- b. Additionally, independent claims 40 and 72 lack a positive recitation that what is claimed is a computer readable medium having executable computer code that when executed causes a computer to perform the steps described by the claim limitations. As currently written, the claimed computer program and storage medium appears to consist of functional descriptive material; see MPEP Section 2106, subsection IV.B.1(a).
- c. All dependent claims inherit these defects.

Claim Rejections - 35 USC § 112

16. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

17. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

18. Claims 1-11, 16-32, 40-50 and 55-71 are rejected under 35 U.S.C. 112, first

paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention. The claims fail to clearly define the output of the invention.

19. Claims 40-78 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "computer program product" is vague and indefinite. All dependent claims inherit this defect.

Claim Rejections - 35 USC § 103

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

21. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

22. The prior art used for these rejections is as follows:

23. The FEMLAB® Reference Manual, Version 1.0, dated July 1998. (Henceforth "FEMLAB").

24. Brenner, S. et al. The Mathematical Theory of Finite Element Methods. © 1994. p.12. (Henceforth "Brenner").

25. The claim rejections are hereby summarized for Applicant's convenience. The detailed rejections follow.

26. Claims 1, 33, 40, and 72 are rejected under 35 U.S.C. 103(a) as being unpatentable over FEMLAB in view of Brenner.

27. The FEMLAB® Reference Manual teaches:

- a. "The core of FEMLAB is a set of algorithms for discretizing and solving Partial Differential Equations (PDE)." (see pages 3-21 to 3-27. The quote is on page 3-21).

- b. The use of Dirichlet and generalized Neumann boundary conditions in the coefficient form of PDE (see page 3-23).
- c. The use of Jacobians to solve PDE in the coefficient form (see pages 3-26 to 3-27), and a non-linear solver for obtaining the Jacobians (see pages 3-60 to 3-66).
- d. The “weak form” (or “variational form”) of the differential of the partial differential equation (see pages 3-40 to 3-41).

However, the FEMLAB® Reference Manual, Version 1.0 does not teach the use of “at least one non-local coupling” to determine a representation of a partial differential equation system.

The Brenner reference, on the other hand, expressly teaches that “we wish to derive estimates for the error, $u - u_s$, in the point-wise sense” (See Brenner: p.12, Section 0.7 “Local Estimates”). Examiner interprets that these “Local Estimates” correspond to the claimed “non-local coupling”.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of FEMLAB with those of Brenner, because doing so would help estimate the point-wise error.

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is

Art Unit: 2123

(571) 272-3714. The examiner can normally be reached on Monday through Thursday, and the first Friday of a biweek, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached at (571) 272-3749.

Any response to this office action should be faxed to (571) 273- 8300, or mailed to:

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P.O. Box 1450
Alexandria, VA 22313-1450

or hand carried to:

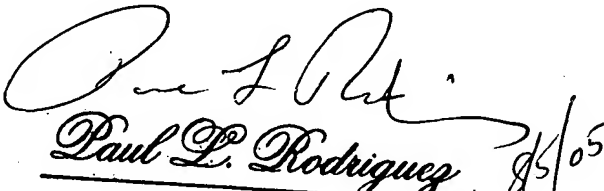
USPTO
Customer Service Window
Randolph Building
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Alexandria, VA 22314

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Tech Center 2100 Receptionist, whose telephone number is (571) 272-2100.

Ayal I. Sharon

Art Unit 2123

August 4, 2005


Paul L. Rodriguez 8/5/05
Primary Examiner
Art Unit 2125